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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,968	03/31/2004	Daewoong Suh	884.C34US1	7708
21186	7590	10/23/2006	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			SMITH, BRADLEY	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/815,968

Applicant(s)

SUH ET AL.

Examiner

Bradley K. Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 30-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 30-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1- 14 and 30-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification fail to disclose the deposition of the SCC on a board concurrently with the bonding of the mating an electric die to the board. (The examiner will treat these as different steps for the rejection.)

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5-10, and 30-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Imamura et al. (2002/0185309). Imamura et al. disclose mating a microelectronic die (100) substrate to a board (113), wherein the substrate includes an upper surface, a lower surface, and a solder first bump (112) disposed on the lower surface; and while mating forming a flux (114) on the board, wherein the flux abuts the solder first bump (the examiner is equating the flux to the stress compensation collar because they are both made of the same material, i.e. resin flux). With regards to claim 2, Imamura et al. disclose the solder balls are embedded in the flux from about 5% to 95% (see figure 2C). With regards to claim 3, Imamura et al. disclose reflowing the solder bumps (0007). With regards to claim 5, Imamura et al. disclose dispensing a mass on the board (0061). With regards to claim 6, Imamura et al. disclose dispensing the mass in spaced apart spots (see figure 1). With regards to claims 7-9, Imamura et al. disclose the flux comprising an epoxy resin (0066). With regards to claim 10, Imamura et al. disclose forming a single mass on the board.

Claims 1, and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (2003/0096453). Wang et al. disclose mating a microelectronic die (203) substrate to a board (202), wherein the substrate includes an upper surface, a lower surface, and a solder first bump (204) disposed on the lower surface; and while mating forming a flux (403) on the board, wherein the flux abuts the solder first bump (the examiner is equating the flux to the stress compensation collar because they are both made of the same material). With regards to claim 4, Wang et al. disclose reflowing the solder bumps and curing the flux/ resin (figure 2).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. in view of Capote et al. Wang et al. disclose mating a microelectronic die (203) substrate to a board (202), wherein the substrate includes an upper surface, a lower surface, and a solder first bump (204) disposed on the lower surface; and while mating forming a flux (403) on the board, wherein the flux abuts the solder first bump (the examiner is equating the flux to the stress compensation collar because they are both made of the same material). With regards to claim 12 -14, Wang et al. disclose reflowing the solder bumps and curing the flux/ resin (figure 2). Wang et al. fails to teach the stress reduction layer on the bottom of the substrate. However, Capote teaches the formation of a stress distribution (reduction) layers (38) on the bottom of the substrate (see figure 18 and 19). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wang and Capote because the stress reduction layer would reduce or distribute stress when the substrates are bonded.

Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imamura et al. in view of Ludwig et al. Imamura et al. disclose mating a

microelectronic die (100) substrate to a board (113), wherein the substrate includes an upper surface, a lower surface, and a solder first bump (112) disposed on the lower surface; and while mating forming a flux (114) on the board, wherein the flux abuts the solder first bump (the examiner is equating the flux to the stress compensation collar because they are both made of the same material, i.e. resin flux) and contacting the more than half of the solder bumps with a stream of mass. Imamura fails to disclose the use of a translational gantry in depositing the flux. However Ludwig et al. disclose the deposition of flux using a translational gantry. Lastly the examiner takes official notice that it would be well known for one of ordinary skill for one to modify the flow of the stream of mass or the transitional speed of the gantry especially since the gantry is automated ( Ludwig paragraph 0017-0018 disclose control of the gantry system).. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Imamura et al. and Ludwig et al. because the x-y gantry would enable one to discretely place flux on the circuit board (Capote 0006).

Claims 37-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. in view of Capote et al. as applied to claim 11 above, and further in view of Ludwig et al. Wang et al. and Capote et al. disclose the formation of a stress relief layer on a substrate. Wang et al. and Capote et al. fail to disclose the use of a translational gantry in depositing the flux. However Ludwig et al. disclose the deposition of flux using a translational gantry. Lastly the examiner takes official notice that it would be well known for one of ordinary skill for one to modify the flow of the stream of mass or the

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translational speed of the gantry especially since the gantry is automated( Ludwig paragraph 0017-0018 disclose control of the gantry system). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wang et al, Capote et al. and Ludwig et al. because the x-y gantry would enable one to discretely place a stress reduction layer (flux) on the substrate (Capote 0006).

### ***Response to Arguments***

Applicant's arguments filed 8/3/06 have been fully considered but they are not persuasive. With regard to the 112 2<sup>nd</sup> rejection the examiner has withdrawn the rejection.

With regards to the 102 rejections, the applicant contends that Imamura et al fails to disclose the current invention because an additional step of removing the metal grains/flux is performed. This is not persuasive because Imamura still teaches bonding the substrate and forming the SCC. With regards to the second argument that Imamura fails to disclose the deposition and the mating at the same time the examiner cannot find where in the specification they occur concurrently. With regards to the second 102 rejection, the examiner has changed the element number to show Wang disclose a flux. Furthermore with regard to the 103 rejections the examiner has fixed the errant element number in Wang, and clarified the rejections using a translational gantry.

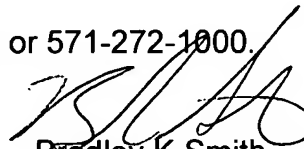
### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bradley K. Smith whose telephone number is 571-272-1884. The examiner can normally be reached on 10-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Bradley K Smith  
Primary Examiner  
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